

CLAIMS

1. A hot rolled steel sheet for processing, comprising: in terms of percent by mass,

C of 0.01 to 0.2%;

5 Si of 0.01 to 0.3%;

Mn of 0.1 to 1.5%;

P of $\leq 0.1\%$;

S of $\leq 0.03\%$;

Al of 0.001 to 0.1%;

10 N of $\leq 0.006\%$; and

as a remainder, Fe and unavoidable impurities,

wherein the microstructure includes a main phase in the form of polygonal ferrite and a hard second phase, a volume fraction of the hard second phase is 3 to 20%, a hardness ratio (hardness of the hard second phase / hardness of the polygonal ferrite) is 1.5 to 6, and a grain size ratio (grain size of the polygonal ferrite / grain size of the hard second phase) is 1.5 or more.

2. The hot rolled steel sheet for processing according to claim 1, which further comprises, in terms of percent by mass, one or more selected from

20 B of 0.0002 to 0.002%,

Cu of 0.2 to 1.2%,

Ni of 0.1 to 0.6%,

Mo of 0.05 to 1%,

V of 0.02 to 0.2%, and

25 Cr of 0.01 to 1%.

3. The hot rolled steel sheet for processing according to claim 1, which further comprises, in terms of percent by mass, one or two of

Ca of 0.0005 to 0.005% and

5 REM of 0.0005 to 0.02%.

4. The hot rolled steel sheet for processing according to claim 1, which is treated with zinc plating.

10 5. A method for manufacturing a hot rolled steel sheet for processing, the method comprising:

a step of subjecting a slab having: in terms of percent by mass, C of 0.01 to 0.2%; Si of 0.01 to 0.3%; Mn of 0.1 to 1.5%; P of $\leq 0.1\%$; S of $\leq 0.03\%$; Al of 0.001 to 0.1%; N of $\leq 0.01\%$; and as a remainder, Fe and unavoidable impurities to a rough rolling so as to
15 obtain a rough rolled bar;

a step of subjecting the rough rolled bar to a finish rolling so as to obtain a rolled steel under conditions in which a sum of reduction rates of the final stage and the stage prior thereto is 25% or more, the reduction rate of the final stage is 1 to 15%, and a finishing temperature is in a temperature range from A_{r3} transformation point temperature
20 to (A_{r3} transformation point temperature + 100°C); and

a step of holding the rolled steel in a temperature range from below the A_{r3} transformation point temperature to the A_{r1} transformation temperature or higher for 1 to 15 seconds and then cooling to 350°C at a cooling rate of 100°C/sec or more so as to obtain a hot rolled steel sheet, and coiling the hot rolled steel sheet at a temperature of
25 below 350°C.

6. The method for manufacturing a hot rolled steel sheet for processing according to claim 5, wherein a starting temperature of the finish rolling is set to (Ar_3 transformation point temperature + 250°C) or higher.

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7. The method for manufacturing a hot rolled steel sheet for processing according to claim 5, wherein the rough rolled bar or the rolled steel is heated during the time until the start of the step of subjecting the rough rolled bar to the finish rolling and/or during the step of subjecting the rough rolled bar to the finish rolling.

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8. The method for manufacturing a hot rolled steel sheet for processing according to claim 5, wherein descaling is carried out during the time from the end of the step of subjecting the slab to the rough rolling to the start of the step of subjecting the rough rolled bar to the finish rolling.

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9. The method for manufacturing a hot rolled steel sheet for processing according to claim 5, wherein the resulting hot rolled steel sheet is immersed in a zinc plating bath so as to galvanize the surface of the hot rolled steel sheet.

20 10. The method for manufacturing a hot rolled steel sheet for processing according to claim 9, wherein an alloying treatment is carried out after galvanizing.